

Applications Of Nanotechnology In Mechanical Engineering

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Nanotechnology in Aerospace and Structural Mechanics Elsevier

Engineering Applications of Nanotechnology Springer

Nanotechnology in the Automotive Industry CRC Press

Nanotechnology in the Automotive Industry explores how nanotechnology and nanomaterials are used to enhance the performance of materials and devices for automotive application by fabricating nano-alloys, nanocomposites, nano coatings, nanodevices, nanocatalysts and nanosensors. Consisting of 36 chapters in 6 parts, this new volume in the Micro and Nano Technologies series is for materials scientists, nanotechnologists and automotive engineers working with nanotechnology and nanomaterials for automotive applications. Nanotechnology is seen as one of the core technologies for the future automotive industry to sustain competitiveness. The benefits that nanotechnology brings to the automotive sector include stronger and lighter materials for increased safety and reduced fuel consumption, improved engine performance and fuel consumption for gasoline powered vehicles due to nanocatalysts, fuel additives and lubricants, and more.

Discusses various approaches and techniques such as nanoalloys, nanocomposites, nanocoatings, nanodevices, nanocatalysts and nanosensors used in modern vehicles Presents the challenges and future of automotive materials Explores how nanotechnology and nanomaterials are used to enhance the performance of materials and devices for automotive applications

Graphene and Nanoparticles Hybrid Nanocomposites Springer

"This book provides the latest developments in the field of space research and structural mechanics. It also explores the mechanics of nanomaterials, the advancement of their electronic properties, the development of the methods of synthesis of the nanomaterials for fabricating nanodevices, and related technological expertise to assemble the nano components for fabricating the devices"--

Nanotechnology in Aerospace and Structural Mechanics Springer

Nature

The application of nanotechnology within the medical sphere has had a significant influence on how diseases and conditions are treated and diagnosed. While many strides have been made, there is still continuous research on nanotechnology being performed in the field. Advancing Medicine through Nanotechnology and Nanomechanics Applications highlights emergent trends and empirical research on technological innovations in medicine and healthcare. Investigating the impact of nanotechnology and nanomechanics on the treatment of diseases, regenerative medicine, and drug delivery systems, this publication is a vital reference source for professionals, researchers, medical students, and engineering students.

Applications of Electrochemistry and Nanotechnology in Biology and Medicine I Springer Science & Business Media

The realms of aerospace and structural mechanics have been revolutionized due to a plethora of technological advances. These two important sectors most notably have been impacted by the advancement of nanotechnology and have introduced potential groundbreaking changes for lightweight, high strength, and improved electronic properties of nanomaterials. Nanotechnology in Aerospace and Structural Mechanics aims to provide a collection of innovative research on the latest development of materials and methods for designing smart and intelligent devices for use in the field of space research and structural mechanics. It provides a thorough study of the fabrication and control of mechanical systems required for the successful application of nanotechnology in aerospace and structural engineering. While highlighting topics including nanomaterial properties, aerospace electronics, and polymer nanocomposites, this book is ideally designed for engineers, researchers, students, and academicians with interests in the fields of civil engineering, mechanical engineering, aerospace engineering, and nanoscience.

Emerging Nanotechnology Applications in Electrical Engineering Elsevier Handbook of Nanotechnology Applications: Environment, Energy, Agriculture and Medicine presents a comprehensive overview on recent developments and prospects surrounding nanotechnology use in water/wastewater separation and purification, energy storage and conversion, agricultural and food process, and effective diagnoses and treatments in medical fields. The book includes detailed overviews of nanotechnology, including nanofiltration membrane for water/wastewater treatment, nanomedicine and nanosensor development for medical implementation, advanced nanomaterials of different structural dimensions (0D, 1D, 2D and 3D) for energy applications, as well as food and agricultural utilization. Other sections discuss the challenges of lab-based research transitioning towards practical industrial use. Helps scientists and

researchers quickly learn and understand the key role of nanotechnology in important industrial applications Takes an interdisciplinary approach, demonstrating how nanotechnology is being used in a wide range of industry sectors Outlines the role nanotechnology plays in creating safer, cheaper and more energy-efficient projects and devices

Engineering Applications of Nanotechnology Amsterdam University Press

This book grew out of my desire to understand the mechanics of nanomaterials, and to be able to rationalize in my own mind the variety of topics on which the people around me were doing research at the time. The field of nanomaterials has been growing rapidly since the early 1990s. Initially, the field was populated mostly by researchers working in the fields of synthesis and processing. These scientists were able to make new materials much faster than the rest of us could develop ways of looking at them (or understanding them). However, a convergence of interests and capabilities in the 1990s led to the explosive growth of papers in the characterization and modeling parts of the field. That convergence came from three primary directions: the rapid growth in our ability to make nanomaterials, a relatively newfound ability to characterize the nanomaterials at the appropriate length and time scales, and the rapid growth in our ability to model nanomaterials at atomistic and molecular scales. Simultaneously, the commercial potential of nanotechnology has become apparent to most high-technology industries, as well as to some industries that are traditionally not viewed as high-technology (such as textiles). Much of the rapid growth came through the inventions of physicists and chemists who were able to develop nanotechnology products (nanomaterials) through a dizzying array of routes, and who began to interface directly with biological entities at the nanometer scale. That growth continues unabated.

Application of Nanotechnology in Water Research IGI Global

This book focuses on the use of nanotechnology in several fields of engineering. Among others, the reader will find valuable information as to how nanotechnology can aid in extending the life of component materials exposed to corrosive atmospheres, in thermal fluid energy conversion processes, anti-reflection coatings on photovoltaic cells to yield enhanced output from solar cells, in connection with friction and wear reduction in automobiles, and buoyancy suppression in free convective heat transfer. Moreover, this unique resource presents the latest research on nanoscale transport phenomena and concludes with a look at likely future trends.

Emerging Trends in Nanotechnology I. K. International Pvt Ltd

Volume is indexed by Thomson Reuters CPCI-S (WoS). The objective of this special collection was to provide an excellent platform for updating and discussing the latest advances in precision engineering-related fields by researchers and engineers from research laboratories, academia and industry all over the world. The volume covers a wide gamut of topics in precision engineering-related fields, ranging over precision machining, advanced measurement techniques and green and sustainable manufacturing. This work will provide a stimulus and inspiration for future studies and advancement in precision engineering and manufacturing technologies.

Advances in Precision Engineering Springer

Details the water research applications of nanotechnology in various areas including environmental science, remediation, membranes, nanomaterials, and water treatment At the nano size, materials often take on unique and sometimes unexpected properties that result in them being 'tuned' to build faster, lighter, stronger, and more efficient devices and systems, as well as creating new classes of materials. In water research, nanotechnology is applied to develop more cost-effective and high-performance water treatment systems, as well as to provide instant and continuous ways to monitor water quality. This volume presents an array of cutting-edge nanotechnology research in water applications including treatment, remediation, sensing, and pollution prevention. Nanotechnology applications for waste water research have significant impact in maintaining the long-term quality, availability, and viability of water. Regardless of the origin, such as municipal or industrial waste water, its remediation utilizing nanotechnology can not only be recycled and desalinated, but it can simultaneously detect biological and chemical contamination. Application of Nanotechnology in Water Research describes a broad area of nanotechnology and water research where membraneprocesses (nanofiltration, ultrafiltration, reverse osmosis, and nanoreactive membranes) are considered key components of advanced water purification and desalination technologies that remove, reduce, or neutralize water contaminants that threaten human health and/or ecosystem productivity and integrity. Various nanoparticles and nanomaterials that could be used in water remediation (zeolites, carbon nanotubes, self-assembled monolayer on mesoporous supports, biopolymers, single-enzyme nanoparticles, zero-valent iron nanoparticles, bimetallic iron nanoparticles, and nanoscale semiconductor photocatalysts) are discussed. The book also covers water-borne infectious diseases as well as water-borne pathogens, microbes, and toxicity approach.

Synthetic Engineering Materials and Nanotechnology IGI Global

The study of electrochemical nanotechnology has emerged as researchers apply electrochemistry to nanoscience and nanotechnology. These two related volumes in the Modern Aspects of Electrochemistry Series review recent developments and breakthroughs in the specific application of electrochemistry and

nanotechnology to biology and medicine. Internationally renowned experts contribute chapters that address both fundamental and practical aspects of several key emerging technologies in biomedicine, such as the processing of new biomaterials, biofunctionalization of surfaces, characterization of biomaterials, discovery of novel phenomena and biological processes occurring at the molecular level. **Nanotechnology Safety** IGI Global

This book discusses new trends in nanotechnology. It covers a wide range of topics starting from applications of nanomaterials in perovskite solar cells, pharmacy, and dentistry to self-assembled growth of GaN nanostructures on flexible metal foils by laser molecular beam epitaxy. It also includes other interesting topics such as advancement in carbon nanotubes; processing techniques, purification and industrial applications, metal dichalcogenides for waste water treatment and recent advancement in nanostructured-based electrochemical genosensors for pathogen detection and many more. The book will be of great interest to researchers, professionals and students working in the areas of nanomaterials and nanotechnology.

Nanotechnology and Nanometrology for Mechanical Engineering Applications Elsevier

This book highlights the mechanical properties of nanomaterials produced by several techniques for various applications. The dislocations observed in specimens obtained in nanomaterials are discussed on the chapter about deformation process. Partial dislocations and grain boundary sliding deformation phenomena in nanomaterial specimens are also deeply discussed. Tests for tension, compression, and hardness are described. The behavior of nanomaterials is compared to macroscale specimens, and the results obtained for different fabrication methods are also compared. The special characteristics of nanomaterials are summarized at the end of the book.

Engineering Applications of Nanotechnology

This book describes the use of modern micro- and nanofabrication technologies to develop improved tools for stimulating and recording electrical activity in neuronal networks. It provides an overview of the different ways in which the "nano-world" can be beneficial for neuroscientists, including improvement of mechanical adhesion of cells on electrodes, tight-sealed extracellular recordings or intracellular approaches with strongly reduced invasiveness and tools for localized electrical or optical stimulation in optogenetics experiments. Specific discussion of fabrication strategies is included, to provide a comprehensive guide to develop micro and nanostructured tools for biological applications. A perspective on integrating these devices with state-of-the-art technologies for large-scale in vitro and in vivo experiments completes the picture of neuronal interfacing with micro- and nanostructures.

Springer Handbook of Nanotechnology Engineering Science Reference

This book provides an overview of the electronic applications of nanotechnology. It presents latest research in the areas of nanotechnology applied to the fields of electronics and energy. Various topics covered in this book include nanotechnology in electronic field, electronic chips and circuits, batteries, wireless devices, energy storage, semiconductors, fuel cells, defense and military equipment, and aerospace industry. This book will be useful for engineers, researchers and industry professionals primarily in the fields of electrical engineering, materials science and nanotechnology.

Our Nanotechnology Future IGI Global

Potential of Nanotechnology is immense and encompasses virtually every field of life. Technologists and researchers all across the globe have realized this and call it the Technology of the Future. The book is intended to develop interest amongst students of all branches of Engineering and incumbent researchers so that they get to know fundamentals of the subject. The book deals with all the aspects of nanotechnology and its fundamentals and applications, i.e. Nanotechnology, tools and techniques, nanomaterials, nanocomputers, nanocomposites, risks related with the use of nanotechnology and its relation with the environment. Applications of nanotechnology in textiles, solar power, electronics, space explorations and in communication find a reasonable place in the book.

Mechanical Properties of Nanomaterials I. K. International Pvt Ltd

Over the past few decades, devices and technologies have been significantly miniaturized from one generation to the next, providing far more potential in a much smaller package. The smallest of these recently developed tools are minuscule enough to be invisible to the naked eye. Nanotechnology: Concepts, Methodologies, Tools, and Applications describes some of the latest advances in microscopic technologies in fields as diverse as biochemistry, materials science, medicine, and electronics. Through its investigation of theories, applications, and new developments in the nanotechnology field, this impressive reference source will serve as a valuable tool for researchers, engineers, academics, and students alike.

Dental Applications of Nanotechnology CRC Press

Nanocrystalline materials exhibit exceptional mechanical properties, representing an exciting new class of structural materials for technological applications. The advancement of this important field depends on the development of new

fabrication methods, and an appreciation of the underlying nano-scale and interface effects. This authored book addresses these essential issues, presenting for the first time a fundamental, coherent and current account at the theoretical and practical level of nanocrystalline and nanocomposite bulk materials and coatings. The subject is approached systematically, covering processing methods, key structural and mechanical properties, and a wealth of applications. This is a valuable resource for graduate students studying nanomaterials science and nanotechnologies, as well as researchers and practitioners in materials science and engineering.

What Is Nanotechnology and Why Does It Matter? Elsevier

The energy sector continues to receive increased attention from both consumers and producers due to its impact on all aspects of life. Electrical energy especially has become more in demand because of the delivery of the service to a large percentage of consumers in addition to the progress and increase of industrial production. It is thus necessary to find advanced systems capable of transferring huge amounts of electrical energy efficiently and safely. Nanotechnology aims to develop new types of atomic electronics that adopt quantum mechanics and the movement of individual particles to produce equipment faster and smaller and solve problems attributed to the electrical engineering field. *Emerging Nanotechnology Applications in Electrical Engineering* contains innovative research on the methods and applications of nanoparticles in electrical engineering. This book discusses the wide array of uses nanoparticles have within electrical engineering and the diverse electric and magnetic properties that nanomaterials help make prevalent. While highlighting topics including electrical applications, magnetic applications, and electronic applications, this book is ideally designed for researchers, engineers, industry professionals, practitioners, scientists, managers, manufacturers, analysts, students, and educators seeking current research on nanotechnology in electrical, electronic, and industrial applications.

Explorations in the Application of Nanotechnology to Improve the Mechanical Properties of Composite Materials Springer Science & Business Media

This book covers the recent research on nanomaterials and nanotechnology based on the hybridization of graphene with other nanoparticles. With their simple synthesis, nanoscale dimensions, high aspect ratio, mechanical, electrical and thermal properties, graphene and its hybridized materials have witnessed a great interest, and the chapters in this book cover the spectrum of research from the preparation and synthesis of novel nanocomposites to their potential use in aeronautic, automotive, energy and environmental applications. Written by respected researchers from both industry and academia, this book is of interest to researchers and students working on nanomaterials.